

The Importance of Health Information Systems and Implementation of an Electronic Healthcare System

Nigar Mammadova

*Faculty of Engineering and Applied Sciences,
Khazar University, Azerbaijan
Email: nigar-4t@live.com*

Abstract

As the world's population increases, existing medical systems face many problems in terms of the quality and intensity of medical care. One way to resolve these problems lies in the use of information and communication technologies in the health sector. To date, rich experience has been gained in the use of ICT to ensure a certain level of quality of medical care and accessibility for patients. ICT in healthcare helps to optimize the use of resources in the work of individual medical organizations, as well as in the management of public health systems at national or local level. Modern technologies are currently in use in the healthcare system of the Republic of Azerbaijan. Even now there is rapid development in e-health systems. The processes involved in making an appointment with a doctor are much easier than in previous years. New integrated technologies are also used in the examination of patients. Some hospitals even use a modern hospital management system.

Keywords: Electronic Healthcare System; Health Information System; Electronic Medical Record System; Electronic Health Record System

Introduction

A Health Information System (HIS) is a document management system for medical institutions that combines a medical decision-making support system, electronic medical records on patients, digital medical research data, data from devices monitoring patients' medical conditions, as well as financial and administrative information. HISs usually apply data transfer standard, which describes the procedures and mechanisms for the exchange, management and integration of electronic medical information. A healthcare system based on the application of

information and communication technologies provides users with a wide range of healthcare services. Typically, these services are provided over the Internet (Athina & Konstantinos, 2008).

Do we need a Health Information System?

A health information system (HIS) is a necessary element of IT technology in modern medicine.

The HIS is designed to automate the clinical areas of the work carried out by medical staff. It implements patients' electronic medical records and organizes effective communication between all participants in diagnostic and treatment processes. For example: in working online, no time is wasted in duplicating and entering data into new documents for exchange with other doctors and administration. Patient data, treatment progress, prescriptions and receipts are available online, but only to those who have access to the systems.

HIS reduces, and completely eliminates some routine operations in the preparation of medical documentation, thereby increasing the quality and information content of those documents. In fact, it removes or significantly reduces workloads doctors, nurses and medical registrars. So, more time is available for essential work - communication with patients, providing medical care or management of the medical institution supported by information that is objective and reliable.

The Impact of Health Information Systems on the Work of Medical Institutions

A health information system creates electronic structures for the hospital, its departments and offices, and is able to integrate several medical institutions into a single electronic system. It is convenient for clinics to have an electronic online registry, maintaining hospital-wide patient databases on the cloud, monitoring and planning doctors' work schedules. A unique cloud-based web platform stores, transmits and maintains records of electronic prescriptions and appointments.

A service such as a health information system increases loyalty and inspires trust in patients, because the doctor acquires information quickly and shares it with the patient via the Internet or prints it out during an appointment. Convenient online communication with customers, as well as partner insurance and pharmaceutical companies, also saves time and effort during treatment. At the same time, the electronic medical system improves reliability, the quality of health information and the medical services offered.

How Will Doctors Benefit?

Initially, the doctor acquires a single information space for working on patients' medical records and is able to automatically translate them into English or other languages (if there are multiple languages involved). As the system saves all the patient's past and future medical information in one reliable, secure and always accessible place, patient care is delivered more quickly. Using HIS makes it easy for a doctor to create and use templates of all types of medical documentation.

Quick access to all patient records from inpatient or remote locations contributes to better coordinated and more effective medical care. Notification and reminder functions assist doctors to remember necessary tasks - to communicate and interact with laboratories, colleagues or other participants in the diagnostic and treatment processes. The system can report in real-time and thereby minimize medical error. It is also easier to take care of patients' further treatment by appointing scheduled examinations electronically. Modern telemedical services are also available to users of a health information system and will contribute additional income and competitive advantage to doctors. Using the advantages of HIS saves doctors time on maintaining medical records and increases their specialist effectiveness.

The Patient in The New Medical System

The patient also benefits from use of a health information system, which reduces the likelihood of loss or falsification of medical data, and stores it safely in a cloud environment. If necessary, the patient can independently translate the data to another doctor in one of several languages. With HIS, patients receive advance reminders of visits to the doctor and medication. It is also possible to learn quickly the results of laboratory and instrumental tests, and to follow a doctor's prescription of examination and treatment. All these functions of a health information system work for high quality management of health information and reduce the patient's journey from illness to health.

Information technologies are important and necessary components of the development of modern medicine and can optimize business processes in several directions at once. Health information systems raise the quality of service and the level of patient access to medical care. This, in turn, is a priority for the state, medical workers and citizens.

HIS may be classified according to the medical institution's specialism:

- HIS for hospitals
- HIS for clinics and outpatient clinics
- HIS for dental clinics

- HIS for medical institutions.

Electronic Healthcare Systems in The World

The importance of the healthcare system has been stimulated by e-health in recent years. However, different parts of the world are currently at different stages, and e-healthcare systems are more advanced in European countries. E-healthcare systems were introduced much earlier in those countries and so we have an opportunity to see what problems were met along the way and to what extent we have managed to transfer medical institutions over to the use of electronic documentation.



Figure 1. shows statistics for the transition of healthcare systems to electronic bases in different countries in recent years.

E-healthcare systems in Estonia and Russia are analyzed below.

The Electronic Healthcare System in Estonia

The e-healthcare system in Estonia has its own particular characteristics, thanks to which it is possible to resolve almost all formal medical issues. The country's citizens access their electronic medical records using their ID. With just this, they can view all the information about their health in the system. Access to the database is via the portals eesti.ee or digilugu.ee.

The unified state digital registry of health care includes all patient visits to doctors, diagnoses, appointments, test results, images and chronic diseases. From mobile

applications they may add information, such as from a heart rate monitor or an electronic blood pressure monitor. An adult patient can also see health information about their minor children.

Integrated health information system in Estonia:

- automates all aspects of medical activity in the country;
- records full health information about the patient from birth to death;
- based on reliable architecture, completely safe;
- has passed the test of time nationwide.

It is important that the information exchange platform is protected from unauthorized access. Patient data from the database is available only to the attending physician and to the citizen by ID or mobile ID. A citizen can also see when and which specialist accessed their medical data.

The Electronic Healthcare System in Russia

In Russia, the EMR system has been in use since the 20th century. It offers many services and applications. The Russian Federation is currently developing a unified system for the collection of the electronic health records of all medical facilities.

The general architecture of the “ЕГИЗС” (Unified State Information Health System) consists of one segment of centralized system-wide components and one of applied components.

Firstly, according to the concept, there are subsystems for integrating application systems, maintaining a directory of system users, maintaining a register of normative. These also can be dictionaries of medical terminology, an electronic document register, a certification centre management subsystem, operations management and electronic mail management. The components are operated by the Ministry of Health.

The segment of applied components includes transactional, management and reference (information support for citizens, medical staff, students) subsystems.

Applied information systems are divided by level into federal (created by the Ministry of Health) and regional. Subjects, according to the concept, must create and operate regional application systems, and integrate them with federal application systems and centralized services.

The exchange of data between private healthcare organizations and the unified

state system in 2019 is one issue that concerns the medical community. Decree No. 555 of the Government of the Russian Federation, dated 05/05/2018, established a procedure for the provision of data to the EGISP. Its requirements applied to all non-governmental medical organizations, including private clinics and medical centres, from January 1, 2019.

Decree No. 555 prescribes the transfer to “ЕГИСЦ” of a mass of different types of information. First of all, information about the medical organization itself and its doctors. Also, data on cases of medical care, including outpatient, inpatient epicrisis. Experts say that not all private organizations are ready to provide all the data required.

Statistics indicate that a doctor receives from 60% to 80% of the information about a patient's condition by laboratory diagnosis. A current medical history in electronic form not only saves the patient's time but also reduces the number of errors. It significantly improves the efficiency and quality of medical care provision. However, the exchange of data across a city or region is complicated by the fact that medical facilities and laboratories use different information systems. The healthcare market needs a solution that can combine disparate data without significant changes to the processes involved in data exchange.

In 2019, “Netrika” announced an expansion of the functionality of “N3.Health”. This Russian platform is for the integration of health information systems of medical institutions, laboratories, and insurance companies.

The service “N3.Health exchange of laboratory research data” helps medical institutions and laboratories to exchange requests and results of medical research in electronic form. This solution increases the rate of exchange of laboratory data and the availability of research results for doctors. It also reduces the number of unreasonably issued results and errors. The service “Laboratory Test Data Exchange”, based on the integration bus produced by “Netrika”, was launched in St. Petersburg in December 2015. Since then, more than two million directions and research results have been transmitted and received.

Conclusion

Electronic medical records are an effective part of the automatization of health information systems. A health information system creates electronic structures for the hospital, departments and offices. It can integrate several medical institutions into a single electronic system. It increases the integration of information between doctor and patient, making a significant saving of time, and improving quality of service. Fast access to all patient records from inpatient or remote locations contributes to better coordinated and more effective medical care.

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